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Review of Fatal Injuries in the Petroleum Industry for 1983

Statistics Department

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51ST ANNUAL REVIEW OF FATAL INJURIES AS REPORTED BY THE PETROLEUM INDUSTRY TO THE AMERICAN PETROLEUM INSTITUTE FOR 1983

On-Duty Fatalities

One hundred and sixty three oil and gas companies and their subsidiaries, employing 496,000 workers, reported 45 on-duty fatal accidents during the year 1983. This is equivalent to one fatality for every 11,022 workers employed, compared with 8,684 in 1982.

Companies submitted detailed information on the causes of 37 of the fatal on-duty accidents. This information is reviewed herein. A decrease occurred in the number of deaths where motor vehicles were involved, with 5 reported for 1983 compared with 17 in 1982.

Fatal on-duty accidents for 1983 are summarized, by functions and causes, and are compared with similar data for 1982 in Table 1.

TABLE I

Fatalities by Functions and Causes, Years 1983 and 1982

	Cases Reported		Fire and Explosion		Struck by Equipment		Motor Vehicle		Aircraft		Other Causes	
	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982
Total	37	48	9	6	5	8	5	17	2	5	16	12
Function:												
Exploration and Production	11	15	0	1	1	2	1	8	2	4	7	0
Gas Processing	1	1	1	0	0	1	0	0	0	0	0	0
Drilling	2	2	0	0	1	1	0	1	0	0	1	0
Chemicals	3	2	0	0	1	1	0	0	0	0	2	1
Refining	6	6	4	0	0	0	0	0	0	0	2	6
Marketing												
Wholesale	3	5	1	1	0	0	1	3	0	0	1	1
Retail	2	6	0	0	0	0	0	3	0	0	2	3
Pipeline												
Crude & Products	7	2	3	0	1	1	2	1	0	0	1	0
Gas	1	7	0	4	1	2	0	1	0	0	0	0
Marine	0	1	0	0	0	0	0	0	0	0	0	1
Research and Development	0	0	0	0	0	0	0	0	0	0	0	0
Engineering and General Services	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	1	1	0	0	0	0	1	0	0	1	0	0

EXPLORATION & PRODUCTION

Struck by Lightning

The employee, on a surveying operation, was struck and killed by lightning. There had been no prior indication of an electrical storm.

Since this was an "Act of God" there is no known way of preventing a reoccurrence.

Helicopter Crash

A chartered helicopter crashed into the ocean while transferring employees from an offshore platform. Two employees drowned in the crash.

According to a FAA investigation report, the cause of the crash was mechanical failure.

Fatal Injury

The employee was disassembling a turbine meter when the head of the meter blew off, fatally striking him.

Drowning

The employee drowned when a seaplane crashed into the water after takeoff.

Asphyxiation

Two employees were shutting down an air blower. Hydrogen Sulfide gas backed through a check valve and the employees were asphyxiated.

Missing

A pig launching trap door was blown off. An employee was knocked into the ocean. The body was not recovered.

Head Injuries

An employee was involved in a city intersection accident. The employee received head injuries.

Such accidents can be prevented by the practice of defensive driving and the use of seat belts.

Toxic Fumes

Two employees were installing a connection in an overflow tank. It was suspected that the employees were overcome by Hydrogen Sulfide vapors.

GAS PROCESSING

Leaking Gas

The throttling thermostatic control valve of a catalytic heating system was leaking LP-Gas in an unclassified office building. The employee, apparently not detecting the gas upon entering the office, attempted to light a cigarette with a lighter. The gas was ignited and caused second and third degree burns over 79 percent of the employee's body.

Prevention: Domestic type heating systems should be installed in accordance with appropriate industry standards, and manufacturer's recommendations for safe operations should include proper oderization and ventilation and a guage to show the pressure of fuel gas.

DRILLING

Contact with Power Line

An antenna was being relocated in preparation for a drilling rig move. The antenna made contact with a power line, electrocuting an employee.

Struck Head

The employee was loading equipment on board a M/V PBR 117. While handling tag lines, the boat heaved, causing him to strike his head against a suspended load. The employee was knocked unconscious and later died.

An investigation indicated that employee placed himself in a bad position between equipment on the deck and under a suspended load. Action has been taken for continuous instructions on the hazards, with suspended loads and confined spaces, while loading and unloading equipment.

CHEMICALS

Asphyxiated by Nitrogen Gas

The employee entered a tank and was asphyxiated by Nitrogen gas.

The incident was caused by the employee's failure to follow the instructions of the existing confirmed space entry permit program.

Severed Esophagus

A high pressure, 4200 PSIG, water hose was being used to clean heat exchanger tubes. The hose backed out of one of the tubes being cleaned and entered the employee's neck, rupturing his esophagus. This happened before the employee

could remove his foot from the foot-operated treadle. Several modifications have been made to the high pressure equipment to prevent a recurrence.

Electrocuted

Electrical cabinet panels had been removed in preparation for infrared scanning to detect possible "hot spots." This preventative maintenance must be done with equipment in operation. After completing the infrared scanning, the employee accidently contacted energized 12 KV electrical equipment while reinstalling the cabinet doors.

Corrective actions include:

1. Replace existing panel doors with hinged rather than screwed-on panel doors.
2. Open no more than one panel at a time.

REFINING

Boiler Explosion

Two employees were killed in a CO Boiler explosion.

Heart Failure

An emergency condition occurred on a process unit. The employee assisted with opening and closing of valves to shut the unit down. Later, the employee experienced a fatal heart attack.

Flash Fire

The employee was draining product into a sewer. Instead of opening the valve a little at a time, the employee opened it all the way. A flash fire started and burned the employee to death.

Employees are instructed never to open valves all the way. If it seems to be stuck or blocked, they should immediately call maintenance.

Fatal Fall

The employee was reinstalling a 4,160 volt switchgear when he fell into the switchgear and was electrocuted.

Propane Overflow

A somewhat routine upset occurred while starting up the Duo Sol plant. This upset required the transfer of liquid propane from the process to a remotely located storage vessel. A sight glass indicated that the level in the receiving vessel was only half full. In fact, the sight glass level indication was misleading and the vessel was really full.

Shortly after the transfer was started, the vessel overflowed. Liquid propane was discharged through a thermal relief system that was not designed to discharge liquid propane safely.

Three mechanics, using a gasoline powered man lift, were working nearby. A cloud of propane gas, that had formed, was ignited by the man lift; causing a brief, but intense, vapor cloud of flash fire. One mechanic died and the other two sustained serious burn injuries.

Cause and prevention:

1. The sight glass reading was misleading because the sight glass contained phenol and not liquid propane. Phenol is nearly twice the density of propane and, as such, made the tank level appear half full when it was really full. The phenol had come from a bottom layer, which had settled out in the storage tank, and was the first material to be drawn into the sight glass when a reading was taken. The sight glass connections were altered so that it could be assured that the liquid in the glass was propane and not phenol which could be present on the very bottom of the tank.
2. When the tank was filled, it overflowed into a flameless relief system that was designed to release vapor, not liquid. A suitable KO tank was added to capture any future liquid discharges, as well as appropriate alarms and sensors to detect a release and warn people working in the area.

MARKETING—WHOLESALE

Heart Attack

The employee was unloading packaged oils from a company truck, using a hand truck. He suffered a massive heart attack.

Unable to state cause as the employee had passed DOT physical exams each year.

Fatally Burned

The employee was operating a fully loaded gasoline transport truck when the vehicle left the roadway, rolled over and caught fire. The employee was fatally burned.

The employee was alone in the vehicle at the time of the accident. The exact cause was not determined.

Fatal Explosion

The employee, exiting a building, entered a vapor enriched environment. An explosion occurred and the em-

ployee was burned. The vapors were caused by a tank fill overflow.

MARKETING—RETAIL

Shootings

Two employees were shot by unknown assailants at full service facilities.

PIPELINE—CRUDE & PRODUCTS

Struck by Train

The employee was transporting a painting contractor's employee to a rural tank battery in a pickup. The vehicle collided with the right side of a train locomotive, which approached the grade crossing from the driver's left. Both the driver and passenger were killed.

The reason for the accident is unknown. It was mid-morning. The weather was clear and the road was dry. The grade crossing was signed and striped but had no lights or gate.

Lost Control

The driver lost control of the transport truck on a curve and it rolled over. The driver was thrown from the truck and it rolled over on him.

The cause of the accident was excessive speed. The fatality may have been prevented by the use of seat belts.

Explosion

A maintenance crew, consisting of five men, was on site to remove a bottom panel containing the cleanout plate. The panel had been leaking for some time. The tank was 24 feet high with bolted steel panels and 1,500 barrel capacity. It had been emptied of all but 1½ feet of 35° gravity sour crude by automatic and manual custody transfer. The maintenance crew and a contract vacuum truck continued to empty the oil from the tank. The cleanout plate was removed and the crew began swabbing the oil from the tank by using a long handled, regular garage broom. Suddenly a flash explosion occurred and all five crew members were burned. Two employees passed away three weeks later from severe burns. The exact cause of the explosion was not determined.

Fall from Tractor

The employee was mowing a pipeline right-of-way with a tractor and brush hog. The employee fell from the seat of the tractor into the path of the brush hog.

This accident could be prevented by installing an equipment kill switch and the utilization of provided seat belts.

Fatal Flash Fire

A truck driver was unloading crude into a pipeline temporary storage tank. During the unloading process, a flash fire occurred. This resulted in the death of the truck driver. The driver was believed to be inside the tank dike area.

The investigation is still pending. However, preliminary indications were:

a. The truck was within 50 feet from the tank dike area.
b. Non-explosion proof electrical equipment was within 25 feet from the tank dike area.

No cause has been determined.

Drowned

The employee fell from a pipeline platform into the ocean and drowned.

PIPELINE—GAS

Struck by Bulldozer

The water in a pond had been lowered and the dirt allowed to dry. The dirt once covered by water and the dirt adjacent to it was moved by a bulldozer operator to increase the height of an existing dam. After the dam was elevated, the bulldozer operator began the final grade work. The bulldozer operator repeatedly moved the bulldozer back and forth on top of the dam grading, a sixty foot area, for ten minutes. The employee had climbed to the top of the dam grading and was watching some nearby recreational activities when he was backed over by the bulldozer and was fatally injured.

Contributing factors to this accident were:

1. Absence of an audible alarm on the bulldozer.
2. The inattentiveness of the employee to his work surroundings.
3. The preoccupation of the employee with the recreational activities.
4. The attention of the bulldozer operator was primarily focused on the right back area of the bulldozer while backing.

MISCELLANEOUS

Struck Broadside

The employee was enroute from home to a business appointment. The employee stopped at an intersection for a red light. When the light turned green, the employee proceeded into the intersection and was struck broadside on the driver's side. The other vehicle was traveling at an excessive speed. The employee was killed and the other driver was arrested and charged with negligent homicide.